Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters	)	IB Docket No. 16-408

COMMENTS OF ECHOSTAR SATELLITE OPERATING CORPORATION AND HUGHES NETWORK SYSTEMS, LLC

I. Introduction

EchoStar Satellite Operating Corporation ("ESOC") and Hughes Network Systems, LLC ("Hughes," and together with ESOC and their affiliates, "EchoStar") submit these comments in the above-captioned proceeding to update rules and facilitate deployment of non-geostationary satellite orbit ("NGSO") fixed-satellite service ("FSS") systems.[1] As the nation's leading satellite provider of consumer broadband services with more than one million hard-to-reach subscribers in North America, and with EchoStar XIX (a/k/a JUPITER 2) entering service in the near term with the ability to offer FCC-defined broadband speeds, EchoStar welcomes future Ka-band NGSO FSS deployments that will complement its geostationary satellite orbit ("GSO") FSS network offerings. EchoStar is an investor in and partner with NGSO applicant OneWeb and fully supports the mission of delivering affordable broadband globally.

EchoStar further supports rules that will advance Commission policy objectives of fostering future NGSO FSS deployment, provide additional spectrum sharing opportunities for NGSO and GSO FSS operations, and ensure sufficient interference protection of GSO FSS

[1] *See Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters,* Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016) ("*NGSO NPRM*").

networks. Accordingly, EchoStar urges the Commission to modify the U.S. Table of Frequency Allocations to be consistent with existing International Telecommunication Union ("ITU") allocations by conferring co-primary status to GSO FSS operations (along with NGSO FSS) in the 18.8-19.3 GHz and 28.6-29.1 GHz bands.[2] A co-primary GSO FSS allocation will impose minimal burdens on NGSO FSS operations and will advance important policy goals, including ensuring available spectrum for both GSO and NGSO broadband services.

II. EchoStar Relies on Its Growing Fleet of High-throughput Ka-band Satellites to Provide Broadband to Consumers in North America

EchoStar (through Hughes) is the largest provider of satellite broadband services in the United States and, with the recent launch of EchoStar XIX, will shortly be providing FCC-defined broadband service across the continental United States and portions of Alaska. Its primary broadband market is providing service to customers in areas of the country that are unserved or underserved by terrestrial broadband. This market is significant. As the Commission has noted, 34 million Americans live in areas that lack terrestrial fixed, high-speed Internet access.[3] EchoStar is fulfilling that void as the nation's leading satellite provider of consumer broadband services.

EchoStar relies on its growing fleet of Hughes next-generation, high-throughput satellites operating on Ka-band frequencies, including 18.8-19.3 GHz and 28.6-29.1 GHz, to deliver high-speed Internet services to more than one million customers in North America.[4] Today, these

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[2] *See NGSO NPRM* ¶ 12.

[3] *See Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, 2016 Broadband Progress Report, 31 FCC Rcd 699, ¶ 79 (2016) ("As of December 31, 2014, approximately 34 million (10 percent) of Americans lack access to fixed 25 Mbps/3 Mbps advanced telecommunications capability.").

[4] *See* Hughes, Quarterly Report (Form 10-Q), at 33 (May 10, 2016).

satellites include SPACEWAY 3, the world's first commercial satellite with onboard switching and routing,[5] as well as JUPITER 1 (a/k/a EchoStar XVII) and EchoStar XIX, both of which allow for more efficient spectrum use and collectively provide capacity in excess of 200 Gbps.[6]

EchoStar is excited about the technology and marketing partnership it has forged with OneWeb to close the digital divide by bringing affordable broadband service to tens of millions of households, schools, and organizations worldwide.[7] In addition to a financial investment in OneWeb, EchoStar (through Hughes) will develop a ground system of gateways and terminals for the OneWeb network, which will be complementary to its high-throughput JUPITER satellite broadband network.[8]

III. The Commission Should Grant Co-Primary Status to GSO FSS Operations in the 18.8-19.3 GHz and 28.6-29.1 GHz Bands

The Commission should grant co-primary status to GSO FSS operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. Doing so will provide for globally harmonized spectrum consistent with existing ITU allocations, offer additional spectrum sharing opportunities for NGSO and GSO FSS, and impose minimal burdens on NGSO FSS operations.

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[5] *See* PR Newswire, *Hughes' Next-Generation SPACEWAY 3 Satellite Successfully Launched* (Aug. 15, 2007), http://www.prnewswire.com/news-releases/hughes-next-generation-spaceway-3-satellite-successfully-launched-58224077.html.

[6] *See* Hughes, *EchoStar XVII: One of the World's Most Advanced High-throughput Satellites*, http://www.hughes.com/technologies/satellites/echostar-xvii (last visited Feb. 27, 2017).

[7] *See* Hughes, *Hughes Announces Partnership in OneWeb's Innovative Global Satellite Broadband Initiative to Close the Digital Divide* (June 25, 2015), http://europe.hughes.com/resources/hughes-announces-partnership-in-onewebs-innovative-global-satellite-broadband-initiative-to-close-the-digital-divide.

[8] *See id.* An additional $1.2 billion capital investment from SoftBank and other investors will support OneWeb's construction of the world's first high-volume satellite production facility in Exploration Park, Florida, and is expected to create nearly 3,000 new engineering, manufacturing, and supporting jobs in the United States over the next four years. *See* SoftBank, *OneWeb Announces $1.2 Billion in Funded Capital from SoftBank Group and Other Investors* (Dec. 19, 2016), http://www.softbank.jp/en/corp/news/press/sb/2016/20161219_01/.

Currently, under rules adopted over 20 years ago,[9] NGSO FSS is accorded primary status in the 18.8-19.3 GHz and 28.6-29.1 GHz bands, while GSO FSS use of the spectrum is permitted on a secondary basis.[10] These primary NGSO and secondary GSO FSS allocations were adopted to ensure sufficient spectrum for numerous competing NGSO FSS systems expected to be deployed at the time.[11] Despite the Commission's high expectations for Ka-band NGSO FSS deployment, Teledesic and other Ka-band NGSO FSS proponents ultimately surrendered their licenses (voluntarily or involuntarily) or withdrew their applications.[12] Indeed, no NGSO FSS system operated in the Ka-band until O3b's launch of its first four satellites in June 2013.[13] Thus, prior to O3b's 2013 launch, the entire 1,000 MHz of Ka-band spectrum designated for exclusive, primary NGSO FSS use would have remained fallow, but for EchoStar's and other GSO FSS operators' sustained, intensive use of the spectrum on a secondary or non-interference, unprotected basis.

To date, EchoStar has successfully completed coordination of its Ka-band GSO FSS operations with O3b's and OneWeb's NGSO FSS systems, and additional coordinations are pending. Nonetheless, without U.S. allocations for co-primary GSO FSS use of the spectrum,

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[9] *See Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005 (1996) ("*First Ka-band Order*"), *modified by* Third Report and Order, 12 FCC Rcd 22310 (1997) ("*Third Ka-band Order*") .

[10] *See* 47 C.F.R. §§ 2.106 (U.S. Table of Frequency Allocations) & 25.202(a)(1) n.5; *see also Third Ka-band Order* ¶¶ 40, 42-43.

[11] *See First Ka-band Order* ¶ 59.

[12] *See, e.g.,* Public Notice, *Policy Branch Information,* Report No. SAT-00594 (Apr. 3, 2009) (announcing Northrop Grumman surrender of authorization); *AtContact Communications, LLC,* Order, 24 FCC Rcd 10929 (IB 2009) (rescinding license for failure to meet milestones).

[13] *See* O3b Networks, *O3b Takes Control of First Satellites, as In-orbit Testing Successfully Completed* (July 30, 2013), http://www.o3bnetworks.com/o3b-takes-control-first-satellites-orbit-testing-successfully-completed/.

future Ka-band NGSO FSS deployments risk complicating the interference environment and adversely affecting existing and planned GSO FSS operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands.

The Commission's decades-old designation of the spectrum for primary NGSO and secondary GSO use was based on technical assumptions that are no longer applicable. In explaining its decision back in 1996, the Commission stated that "[u]ntil such time as studies are completed in the ITU-R [International Telecommunication Union - Radiocommunication Sector], we cannot conclude that co-frequency sharing is possible between GSO/FSS systems and NGSO/FSS systems and therefore a separate band designation is warranted."[14] Those ITU-R studies on co-frequency GSO/NGSO FSS sharing were subsequently completed and provided a basis for the Commission's finding in 2000 that solutions exist "to allow NGSO FSS operations to share successfully with GSO FSS networks without causing unacceptable interference."[15] But the 1996 designation of Ka-band spectrum was not updated to reflect the Commission's 2000 finding on the feasibility of GSO/NGSO FSS sharing.

Today, this co-primary approach to GSO/NGSO FSS sharing of Ka-band and Ku-band spectrum is in place across the globe (other than a handful of countries such as the United States). Internationally, the 18.8-19.3 GHz and 28.6-29.1 GHz bands are allocated to both GSO and NGSO FSS systems on a co-primary basis. Specifically, under the International Table of Frequency Allocations ("International Table"), the 18.8-19.3 GHz and 28.6-29.1 GHz bands are

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[14] *First Ka-band Order* ¶ 59.

[15] *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range,* First Report and Order and Notice of Proposed Rulemaking, 16 FCC Rcd 4096, ¶ 72 (2000). Although the ITU-R studies on co-frequency GSO/NGSO FSS sharing support sharing solutions for both the Ka-band and Ku-band, the Commission to date has adopted rules allowing GSO/NGSO FSS sharing in the Ku-band only. *See id.* ¶ 1.

allocated to FSS on a co-primary basis for all ITU regions.[16] Further, Footnote 5.523A of the International Table provides that, with the exception of certain grandfathered GSO networks, the spectrum may be used by both NGSO and GSO FSS systems, subject to the coordination rules of Article 9 of the ITU Radio Regulations.[17]

In other words, NGSO FSS systems are required under ITU rules (and by countries other than the United States) to coordinate and share co-primary use of the 18.8-19.3 GHz and 28.6-29.1 GHz bands with GSO FSS operations. Thus, Commission grant of co-primary status to GSO FSS operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands will ensure spectrum sharing and coordination with NGSO FSS systems in accordance with ITU coordination rules and ITU date priorities.

Notably, allowing co-primary GSO FSS use of the 18.8-19.3 GHz and 28.6-29.1 GHz bands will not burden today's global NGSO FSS systems because they must be designed to accommodate co-primary GSO FSS operations in compliance with existing ITU allocations and coordination rules. OneWeb, for example, stated in its U.S. market access filing that it has designed its NGSO system to provide interference protection to both Ka-band and Ku-band GSO networks, as required under Article 22 of the ITU Radio Regulations.[18] OneWeb further explained that the "principle used to protect GSO satellite networks from Ka-band interference from OneWeb is the simple GSO arc avoidance approach,"[19] such that "interference to Ka-band GSO satellite networks can be prevented *without significant burden* on the OneWeb design or

[16] *See* 47 C.F.R. § 2.106.

[17] *See id.* n.5.523A. By excluding application of Article 22.2 of the ITU Radio Regulations (which makes NGSO systems generally secondary to GSO systems), Footnote 5.523A effectively promotes NGSO systems in the 18.8-19.3 GHz and 28.6-29.1 GHz bands to co-equal status with GSO systems.

[18] OneWeb Petition, Attachment A: Technical Information to Supplement Schedule S at 28, IBFS File No. SAT-LOI-20160428-00041 (Apr. 28, 2016).

[19] *Id*. at 34.

operations."[20] Other NGSO FSS applicants similarly have acknowledged that their proposed operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands are subject to ITU rules requiring coordination with GSO FSS systems in accordance with ITU date priorities, and appropriate GSO interference avoidance mechanisms may be required to achieve successful coordination.[21]

Moreover, as required under ITU allocations and coordination rules, NGSO FSS satellite receivers in the 28.6-29.1 GHz band must be designed to accept some interference from non-U.S. GSO FSS gateways. Thus, requiring NGSO FSS satellite receivers to tolerate the same interference level received from U.S. and non-U.S. GSO FSS gateways alike would not require any technical modifications of NGSO satellite receivers or impose any cost burden.

IV. Conclusion

Based upon the foregoing, EchoStar supports rules that will both facilitate future NGSO FSS deployment and ensure sufficient interference protection of GSO FSS operations. Furthermore, to provide additional spectrum sharing opportunities for NGSO and GSO FSS operations, EchoStar urges the Commission to establish co-primary status for GSO FSS operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands, along with appropriate NGSO EPFD limits to permit spectrum sharing with GSO FSS. Such co-primary GSO FSS operations would be consistent with existing international allocations and coordination requirements, and place both U.S.- and non-U.S.-licensed GSO FSS systems in the Ka-band on the same footing for

[20] *Id.* at 33 (emphasis added).

[21] *See, e.g.,* LeoSat, Petition for Declaratory Ruling, Attachment A (Technical Annex), at 15-16, IBFS File No. SAT-LOI-20161115-00112 (Nov. 15, 2016).

interference protection purposes, without imposing any undue burden on NGSO FSS operations.[22]

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[22] *See* OneWeb Petition, Legal Narrative at 1-8, & Attachment A: Technical Information to Supplement Schedule S.